Site scale hydrologic characterization

Mine flow system identified?

Site bulk hydrologic properties from existing mine pumpage, ventilation data?

Geologic mapping (assumed in excellent shape now).

Fracture mapping?

- **Visual**
- **Stereophotography**
- **Tomography (Seismic or Electric?)**

Mapping of zones of high seepage?

- **Visual**
- **Thermal IR**
- **Humidity balances, drift sections**

Site scale geochemical characterization

Residence time for mine pumpage

1. from existing water chemistry data?

2. from new data on environmental tracers from mine discharge samples?

Water chemistry available for individual seeps?

Geochemical modeling of existing water, rock chemistry data?

- **Quick literature search indicates good rock chemistry data available.**
- **Numerous salty fluid inclusions in rock**

Hydrologic Heterogeneity

Variations in fracture density, patterns, and associated hydraulic conductivity?

- **Variations in drift water and water vapor flux, section by section?**
- **Extensive geophysics-based cross-drift tomography?**
- **Extensive water sampling from seeps and newly installed boreholes**

Tracer Tests at Homestake Mine

Long-term tracer tests analogous to those in granite at Stripa? Those tests altered our thinking on flow through fractures, are widely cited.

What is practical?

- **Cross-drift tests, with ponded infiltration?**
  - **Drifts with short vertical separation available? Tracer breakthrough within a year?**
  - **How to identify suitable drifts? Geophysical approaches? Present seep locations? Other ideas?**
  - **Problem, that, unlike Stripa, tests would be performed in existing drifts that have been draining for years, with some host rock becoming unsaturated?**
- **Borehole-to-drift tests as an alternative to cross-drift tests?**